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them being Laplace. If we follow this chain further we shall find that celestial mechanics became the model for an exact science of any class of natural phenomena; and men sought to fashion the whole of mathematical physics after the same plan. It would be hard to overestimate the influence exerted in this way on modern science with all the practical consequences which it has introduced. It is fair to say that we are now reaping some of the practical benefits of the old Greek theory of conic sections, since this theory furnishes one of the essential tools by means of which our present body of science has actually been developed.

Let us take from Greek mathematics another example which illustrates the way in which the value of research is cumulative. Consider Euclid's geometry. It contains an ideal body of doctrine whose form is evidently determined by the author's delight in logical consistency and coherence. It is even yet a model according to which one fashions a careful logical exposition. As is well known, the ordered sequence of its propositions was the guide of the English philosopher Hobbes in constructing his body of philosophical doctrine.

A more recent and totally different kind of example of the value of research is afforded by Mendel's theory of inheritance. About fifty years ago Mendel was engaged in ascertaining the effect produced in various characters by crossing two varieties of peas; for the explanation of the facts which he gathered he offered a theory of inheritance which has since had a remarkable influence on biological thought. And now it appears as if results of profound importance to human progress will arise from the increased knowledge of heredity which Mendel's laws afford.

Examples of this kind might be multiplied indefinitely. The way in which practical consequences of great value have come unexpectedly from research in the past reminds us indeed that specific prediction is useless. When we notice the marvelous rapidity with which scientific facts are now gathered and

compare this with the experience of the past, when we see the present magnificent consequences from the relatively meager material for work in the older time, we feel like asking, What is to be the future of research? To what grandeur will it attain? What blessing will it not bring to the human race? One does not dare to assign a limit to its possibility. How far short of the present marvels of science would have been the boldest predictions of the fathers of a hundred years ago!

A work which in the past has proved itself of so profound importance deserves adequate support in the present. Whence is such support to be derived? I wish to answer this question by saying that every unit in the world community should contribute to it. The state of Indiana should sustain her proper share of men of research, and for the further reasons which I am about to state.

That community in which research of the best quality and greatest amount is done will profit most by the total research of the world. Of course those communities which contribute nothing will in the end receive great benefit also. It will be later in coming to them and it will not manifest that vitality which characterizes it in more favored places; but it will come. A sense of fair play and a wish to profit to the fullest extent require, however, that each state shall properly support research in its own borders. Otherwise it becomes a sort of leech drawing its sustenance in part at the expense of the world at large. And no patriotic citizen can ever consent that his state shall be a pensioner on the bounty of others; it must do its part in the work of general progress.

R. D. CARMICHAEL

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THE TENTH INTERNATIONAL GEOGRAPHICAL CONGRESS

UNDER the sunniest of Italian skies the tenth International Geographical Congress was convened on the morning of the twenty-seventh of March in the historic Aula of the palace of the Campidoglio in Rome. His Majesty,

Victor Emmanuel, honored the occasion with his presence, and brief speeches of welcome were made by the mayor of the city, by Marquis Capelli, the president of the congress, and by the Italian Minister of Public Instruction, to which welcome Professor Otto Nordenskiöld, of Sweden, responded on behalf of the delegates present.

Seldom has so attractive a program of papers been prepared as that which was mailed to geographers throughout the world; but, alas, two successive postponements together amounting to nearly two years, might well be thought sufficient to dampen the enthusiasm alike of committee and prospective guests. It is, therefore, a pleasure to be able to state that in the face of these discouraging conditions the congress was a distinct success; though probably less than it would have been had not the committee decided to adhere strictly to the original program of papers by absentees and refuse all papers offered later than October, 1912.

A partial list of well-known geographers who were in attendance includes: Bruce, Brückner, Chaix, Chisholm, v. Chelnoky, Close, Cvijic, Déchy, Gallois, Hamberg, Heland, Kövesligethy, Lescointes, Loczy, de Margerie, Nordenskiöld, Oberhummer, Peary, Passarge, Penck, Pumpelly, de Quervain, Schott, Schokalsky, Sapper, Stefanssen, Supan, Teleky, Vidal de la Blanche, Wagner and Woeikof.

Geographers of all nations vied with each other in showing honor to Admiral Peary, the discoverer of the North Pole, who represented at the congress both the Association of American Geographers and the Peary Arctic Club. The only other Americans in attendance were Vilhjálmur Stefanssen, the explorer, who represented the American Museum of Natural History, Professor Raphael Pumpelly, Mr. H. L. Bridgeman, representing the American Geographical Society and the Geographical Society of Philadelphia, and the undersigned, as delegate of the American Philosophical Society and the University of Michigan.

As might have been expected, the congress

was less notable for important papers presented than by reason of programs decided upon for international cooperation. Dr. de Quervain presented, however, a preliminary report upon his crossing of Greenland in 1912, and exhibited for the first time his final map of the route and his section across the continent. Professor Emile Chaix, on behalf of the executive committee of the commission on a collection of views to illustrate the terrestrial relief, made a most attractive presentation of the work already accomplished. Mr. Stefanssen described the geographical features of the country traversed on his recent expedition to Arctic America, and outlined briefly his plans for an expedition to Coronation Gulf soon to be undertaken by him for the Canadian government. Captain W. S. Bruce, after giving an account of his Antarctic expedition in the *Scotia*, outlined a projected expedition which will have for its object the direct crossing of the Antarctic continent from the Weddell Sea to McMurdo Sound by way of the South Pole and the inland ice plateau to the west of the mountain ranges in Victoria Land. Professor Kövesligethy, of Budapest, described his method for the prevision of earthquakes based upon the analytical expression of the hysteresis of the earth's outer shell, with data supplied from the velocity of wave propagation. Professor Gaetano Platania described the latest eruption of Mt. Etna with quite remarkable lantern slides from photographs taken by Mr. Frank A. Perret, the American volcanologist.

At the request of the International Commission for the preparation of the "millionth" map of the world, it was decided to hold another official conference, which will be convened in Paris before the close of the present year, to which all civilized nations will be invited to send delegates. For the present the office of the Ordnance Survey in London is to remain the official center of the enterprise, to which therefore all correspondence should be addressed. The congress approved a proposition to prepare a "Universal Geography" to accompany the millionth map, but

no plans were formulated for so pretentious an undertaking. Based upon this world map, it is proposed also to prepare an international aeronautical map of the world on scale of 1:200,000, and an official conference to determine the details is to be convened.

The delegates voted in approval of the proposition that the most important problems to be settled in connection with the international exploration of the north Atlantic Ocean relate to the size, the regional extent and the nature of periodic variations of water layers to the depth of 1,000 meters, and it was recommended to continue systematic observations upon ocean currents and upon the temperature and salinity near the surface of the sea.

The proposition of the Danish Geographical Society was approved to invite the geographical societies of Rome, Madrid, Lisbon, Geneva, London, Berlin, Vienna, New York, Paris, St. Petersburg, Copenhagen, Brussels, Amsterdam, Christiania, Stockholm and Budapest to meet in Denmark in 1914 for the purpose of organizing a World Union of Geographical Societies. A large committee was appointed with one or more members from each country possessing ancient maps of its domain, for the *refection* of these maps, these gentlemen being charged with the preparation of a catalogue to be printed in a geographical journal before the opening of the next congress. Dr. E. L. Stevenson, of the Hispano-American Society of New York, was made the representative for Spain.

Much enthusiasm was shown in approving a proposition to organize in each country during the summer vacation periods of the higher institutions of learning, international courses of instruction in geography, in which foreign savants would be invited to take part. The plan contemplates also the founding of an International Geographical Institute, the seat of which is left for later determination, this institute to direct and coordinate the studies and all geographical initiatives which have an international character.

The difficult questions concerned with the confusing duplicate place names on international frontiers (such, for example, as the

Alps and Pyrenees) it was voted to refer to a commission with a view to securing the general use in each case of a single term, or, when this seems impracticable, terms which are in correspondence. After a warm discussion the proposal to add Spanish to the four official languages of the congress was definitely and decisively rejected. The eleventh international congress it was decided to hold in St. Petersburg in 1916, with a rather general understanding that the next succeeding congress would be convened in Vienna.

The social events included a reception at the palace of the Campidoglio and a complimentary dinner tendered to the delegates by the committee of organization. Delightful local excursions were made to Tivoli, Ostia, Terni and the Alban Hills; and after adjournment there were longer journeys to the Po Valley and Préalpes on the one hand, and upon the other to Naples (Mt. Vesuvius and the *Campi Phlegreii*), Sicily (ascent of Mt. Etna) and Tripoli.

The weather throughout the meeting was perfect and the campagna at its best in its spring garlands of flowers; but it may be questioned whether Rome is not, even without these allurements, too interesting in itself to be an ideal seat for international congresses.

WM. HERBERT HOBBS

April 15, 1913

SCIENTIFIC NOTES AND NEWS

PROFESSOR J. M. ALDRICH, the circumstances of whose enforced retirement from the professorship of zoology and entomology at the University of Idaho, are described by Professor Vernon L. Kellogg in this issue of SCIENCE, has accepted a position in the Bureau of Entomology, U. S. Department of Agriculture.

THE American Geographical Society has conferred its Charles P. Daly gold medal upon Dr. Alfred H. Brooks for his geological and geographical work in Alaska.

THE Georg Neumayer gold medal was bestowed upon Dr. L. A. Bauer, director of the Department of Terrestrial Magnetism of the